

**NPN SILICON PLANAR HIGH VOLTAGE TRANSISTOR**  
**PowerDI<sup>®</sup>5**

**Features**

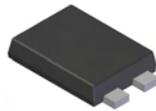
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 2.8W
- $V_{CE0} = 400V$
- $I_C = 300mA$ ;  $I_{CM} = 1A$
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

**Applications**

- PSU start up switch
- Telecom switch

**Mechanical Data**

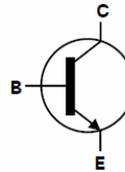
- Case: PowerDI<sup>®</sup>5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.093 grams (approximate)



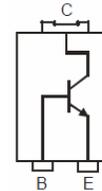
Top View



Bottom View



Device Schematic



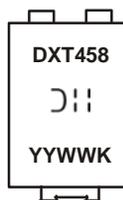
Pin-out diagram

**Ordering Information** (Note 3)

Part Number	Case	Packaging
DXT458P5-13	PowerDI <sup>®</sup> 5	5000/Tape & Reel

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Diodes Inc's “Green” Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



- DXT458 = Product Type Marking Code
-  = Manufacturers' Code Marking
- K = Factory Designator
- YYWW = Date Code Marking
- YY = Last Two Digits of Year (ex: 09 for 2009)
- WW = Week code (01 to 53)

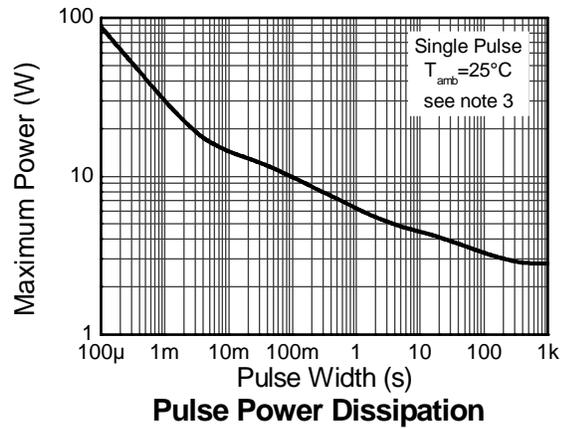
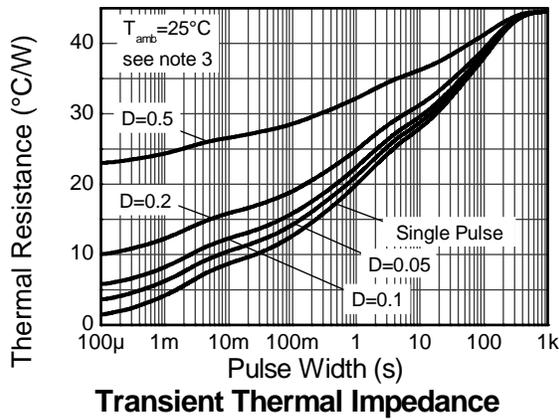
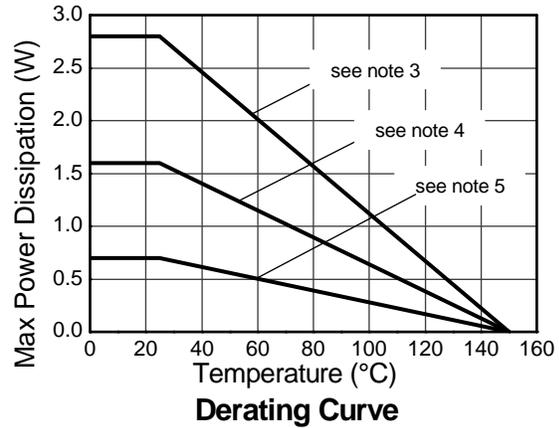
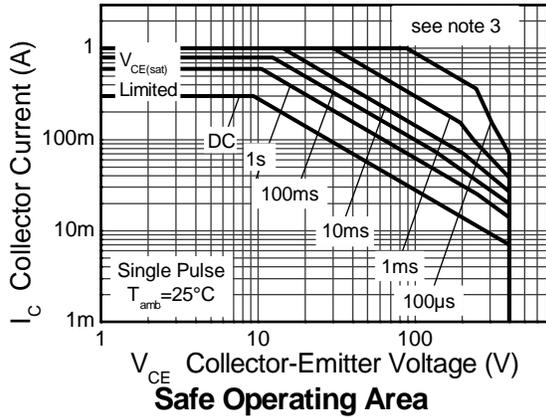
**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	400	V
Collector-Emitter Voltage	$V_{CEO}$	400	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Continuous Collector Current	$I_C$	300	mA
Base Current	$I_B$	200	mA
Peak Pulse Current	$I_{CM}$	1	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 4)	$P_D$	2.8	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	45	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 5)	$P_D$	1.3	W
Thermal Resistance, Junction to Ambient Air (Note 5) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	96	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 6)	$P_D$	0.7	W
Thermal Resistance, Junction to Ambient Air (Note 6) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	179	$^\circ\text{C/W}$
Thermal Resistance, Junction to Collector Terminal	$R_{\theta JT}$	14	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
- 4. Device mounted on 1.6mm FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 50mm x 50mm.
  - 5. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 25mm x 25mm.
  - 6. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.



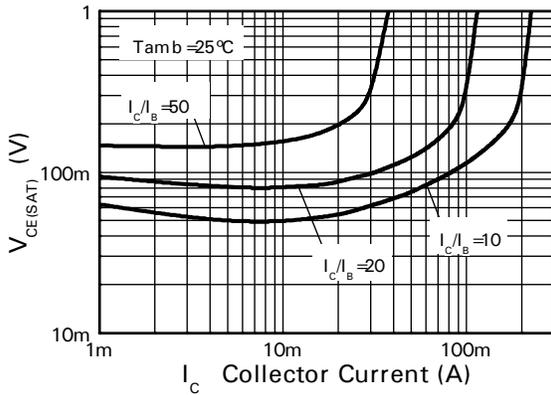
**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	400	–	–	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 7)	V <sub>CEO(sus)</sub>	400	–	–	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	5	–	–	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	–	–	100	nA	V <sub>CB</sub> = 320V
Collector Cutoff Current	I <sub>CES</sub>	–	–	100	nA	V <sub>CB</sub> = 320V
Emitter Cutoff Current	I <sub>EBO</sub>	–	–	100	nA	V <sub>EB</sub> = 4V
Collector-Emitter Saturation Voltage (Note 7)	V <sub>CE(sat)</sub>	–	–	200 500	mV	I <sub>C</sub> = 20mA, I <sub>B</sub> = 2mA I <sub>C</sub> = 50mA, I <sub>B</sub> = 6mA
Base-Emitter Saturation Voltage (Note 7)	V <sub>BE(sat)</sub>	–	–	900	mV	I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
Base-Emitter Turn-On Voltage (Note 7)	V <sub>BE(on)</sub>	–	–	900	mV	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA
DC Current Gain (Note 7)	h <sub>FE</sub>	100 100 15	– – –	– 300 –	–	V <sub>CE</sub> = 10V, I <sub>C</sub> = 1mA V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA V <sub>CE</sub> = 10V, I <sub>C</sub> = 100mA
Transition Frequency	f <sub>T</sub>	50	–	–	MHz	V <sub>CE</sub> = 20V, I <sub>C</sub> = 10mA, f = 20MHz
Output Capacitance	C <sub>obo</sub>	–	–	5	pF	V <sub>CB</sub> = 20V, f = 1MHz
Switching Times	t <sub>on</sub> t <sub>off</sub>	– –	135 2260	– –	ns	V <sub>CC</sub> = 100V, I <sub>C</sub> = 50mA, I <sub>B1</sub> = 5mA, I <sub>B2</sub> = 10mA

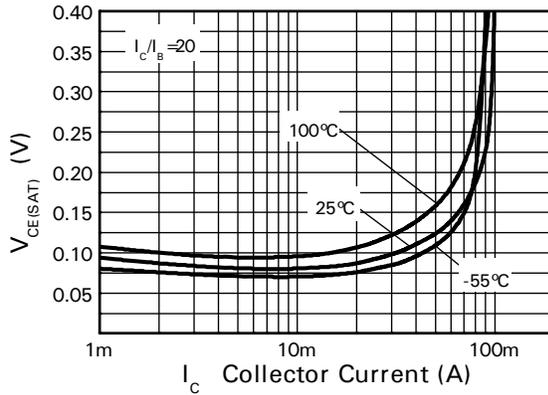
Notes: 7. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.

**Typical Characteristic**

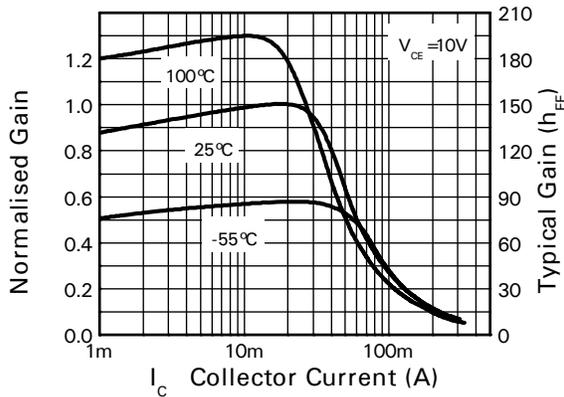
NEW PRODUCT



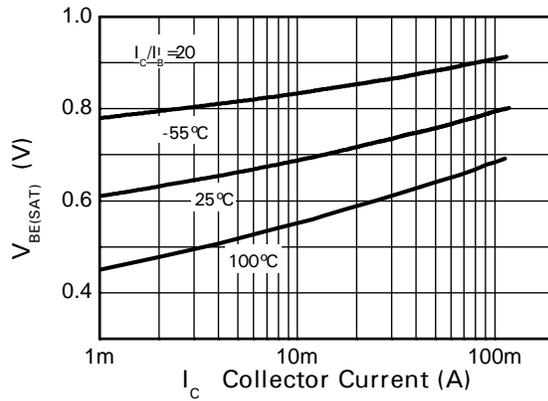
$V_{CE(SAT)} \ v \ I_C$



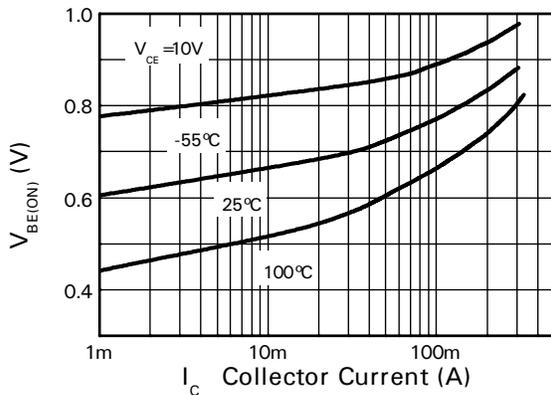
$V_{CE(SAT)} \ v \ I_C$



$h_{FE} \ v \ I_C$

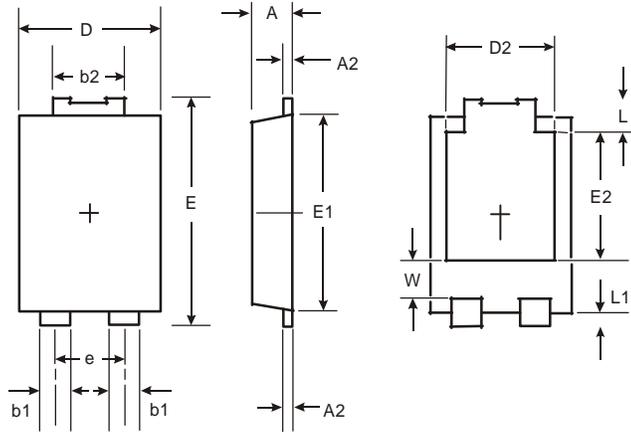


$V_{BE(SAT)} \ v \ I_C$



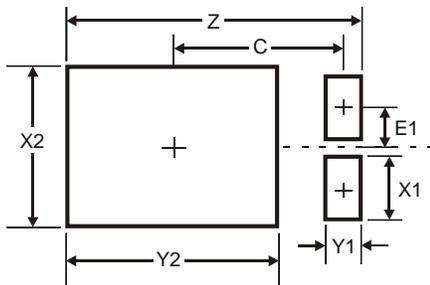
$V_{BE(ON)} \ v \ I_C$

**Package Outline Dimensions**



PowerDI <sup>®</sup> 5		
Dim	Min	Max
A	1.05	1.15
A2	0.33	0.43
b1	0.80	0.99
b2	1.70	1.88
D	3.90	4.05
D2	3.054 Typ	
E	6.40	6.60
e	1.84 Typ	
E1	5.30	5.45
E2	3.549 Typ	
L	0.75	0.95
L1	0.50	0.65
W	1.10	1.41
<b>All Dimensions in mm</b>		

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	6.6
X1	1.4
X2	3.6
Y1	0.8
Y2	4.7
C	3.87
E1	0.9

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